A NEW AMMONITE GENUS FROM THE LOWER JURASSIC (UPPER SINEMURIAN) OF DORSET, ENGLAND

by DESMOND T. DONOVAN

ABSTRACT. *Bagnolites stuarti* gen. et sp. nov. is described from the lower part of the Lias Group (Lower Jurassic, Upper Sinemurian, Obtusum Zone, Stellare Subzone) of the Dorset coast. It is characterized by an involute shell with smooth, trigonal whorls and a distinctive suture line. Its systematic assignment is uncertain but it may be a derivative of the family Arietitidae.

AMMONITES from the Lias Group of the Dorset coast have been studied for more than two hundred years, and the finding of a new form is now a rare event. This paper reports an ammonite found by the late Stuart Bagnoli which does not belong to a previously described genus.

SYSTEMATIC PALAEONTOLOGY

Suborder AMMONITINA Hyatt, 1889
Superfamily PSILOCERATACEAE Hyatt, 1867
Family ARIETITIDAE Hyatt, 1874?
Subfamily ASTEROCERATINAE Spath, 1946?

Genus BAGNOLITES gen. nov.

Derivation of generic and specific names. For the finder, the late Stuart Bagnoli.

Type species. Bagnolites stuarti sp. nov.

Diagnosis. Involute shell with small umbilicus; umbilical suture opening out from about half a whorl before body-chamber. Whorls triangular in section, whorl sides flat, convergent, umbilical slope undercut. Whorl sides smooth. Blunt keel delimited by concave areas. Suture line with lateral saddles very short and nearly flat-topped. Inner whorls and body-chamber unknown.

Remarks. This new ammonite genus is unlike any other known from the Sinemurian Stage, in which most genera of Ammonitina are evolute and strongly ribbed. For comparisons, one must look to the genera showing a tendency to oxycone shell form which are found in the upper half of the Upper Sinemurian. The closest resemblance is to *Eparietites* of which some species have smooth outer whorls. *Eparietites* is the only genus which has a similar venter to the new form, with the keel flanked by concave areas. Some specimens of *Eparietites* from the Frodingham Ironstone, Lincolnshire have a triangular whorl section with undercut umbilical margin like the present genus, but they have ribbed inner whorls and are more compressed and more evolute than *Bagnolites*. The differences between the two genera, shown in Table 1, are held to be sufficient to justify their separation.

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TABLE 1. Comparison of morphological features of *Eparietites* and *Bagnolites*.

Morphological feature	*Eparietites*	*Bagnolites*
Whorl section	Compressed, almost parallel sided	Triangular
Umbilical slope	Normal	Undercut
Shell coiling	Normal	Excentric for outer whorls
Ornament	Ribs persist to end of phragmocone	Smooth at least on outer part of phragmocone
Suture line	Normal 'arietitid'	Short lateral saddles

TEXT-FIG. 1. Top left, *Xipheroceras dudressieri* (d'Orbigny, 1845); top right, *X.* aff. *ziphus* (Zieten, 1830), bottom, *Bagnolites stuarti* gen. et sp. nov.; Bristol City Museums and Art Gallery no. Ce17364, holotype; oblique view; × 1.

EXPLANATION OF PLATE 1

Figs 1–3. *Bagnolites stuarti* gen. et. sp. nov.; Bristol City Museums and Art Gallery no. Ce17364, holotype; Black Ven Marls, probably Bed 85, Charmouth, Dorset. 1, ventral view showing penultimate preserved whorl exposed by preparation. 2, side view. 3, oblique view, and ventral view of *Xipheroceras* aff. *ziphus* (Zieten, 1830).

Fig. 4. *Promicroceras planicosta* (J. Sowerby, 1814) at left; above it, inner whorls of *Cymbites* sp.; (right), *Astcroceras margaritoides* Spath, 1925*b* in same nodule as figures 1–3.

1

2

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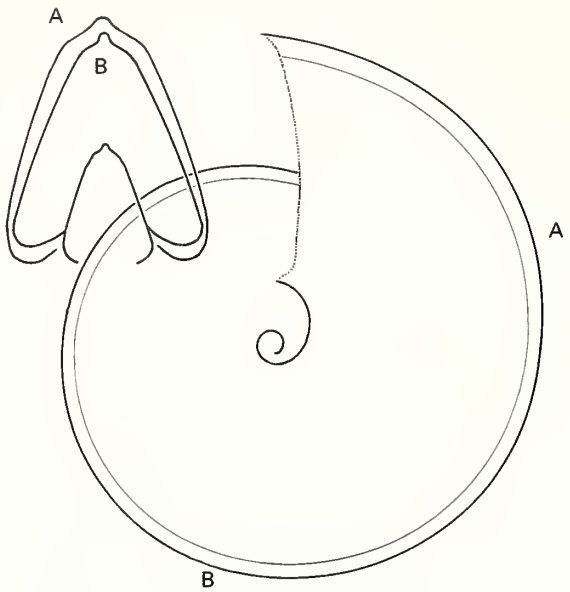
4

DONOVAN, Lias Group ammonites



TEXT-FIG. 2. Reconstructed side view of *Bagnolites stuarti* gen. et sp. nov. at a maximum diameter of 128 mm, probably a little less than its final diameter, and whorl sections at diameters of 93 mm (B) and 114 mm (A).

Other oxycone genera, *Gleviceras* (Raricostatum Zone) and *Oxynoticeras* (Oxynotum Zone), do not have the characteristic venter with concave areas flanking a keel, or undercut umbilical margins, besides being younger in age than the new form.

The present writer has suggested (Donovan 1994) that in the Sinemurian there were two evolutionary lineages leading from evolute, ribbed ammonites towards oxycone, smoother ones: one from *Caenisites* via *Eparietites* to *Oxynoticeras*, the second from *Asteroceras* to *Gleviceras*. Both lineages are represented only intermittently in the well-known north-west European sections. *Bagnolites* does not fit easily either of these hypothetical lineages, although if it is related to either it would be to the former because of its limited resemblance to *Eparietites*. On account of specialized features, not present in *Eparietites*, it is difficult to regard *Bagnolites* as an ancestor of that genus. It most probably represents a separate branch from this lineage, but in the absence of more material further speculation is pointless.

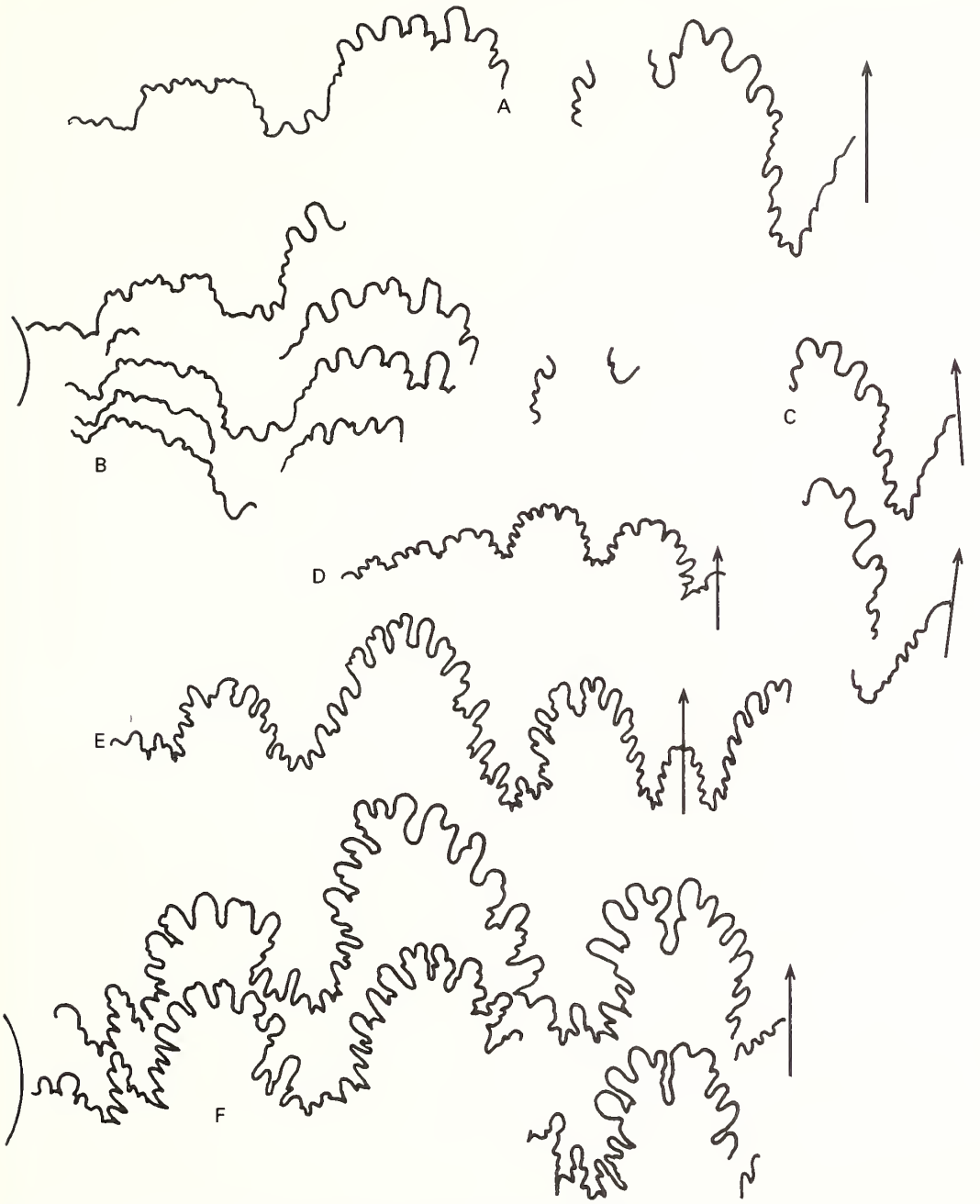
Bagnolites stuarti gen. et sp. nov.

Plate 1; Text-figures 1–3

Holotype. No. Ce17364 in the geological collections of the Bristol Museums and Art Gallery.

Material. The holotype was collected by Stuart Bagnoli from the Black Ven Marls in the lower part of the Lias Group on the coast near Charmouth, Dorset. It is in a nodule which is believed to have come from Lang and Spath's (1926, p. 159) Bed 85 in the Obtusum Zone, Stellare Subzone (see below). After Stuart Bagnoli's death, the specimen was presented to Bristol Museums and Art Gallery in his memory by P. A. and C. A. Langham. No other specimens are known.

Stratigraphical horizon. The specimen was probably not found *in situ* and its horizon was not recorded by the finder, but evidence is provided by other ammonites in the same matrix. These are: *Asteroceras margaritoides* Spath, 1925*b* (two specimens); *Cymbites* sp. (inner whorls); *Promicroceras planicosta* (J. Sowerby, 1814); *Xipheroceras* aff. *ziphus* (Zieten, 1830); *X. dudressieri* (d'Orbigny, 1845). This assemblage shows that the age



TEXT-FIG. 3. A–C, *Bagnolites stuarti* gen. et sp. nov. A, partial reconstruction of suture line. B, dorsal parts of external suture lines at a diameter of 114 mm. C, external lobes at a diameter of 93 mm, reversed; all × 1·87. D, *Oxynoticeras* aff. *simpsoni* (Simpson, 1843); Natural History Museum no. C17108; from Spath (1925*a*, p. 110, fig. c); × 1·79. E, *Eparietites* aff. *denotatus* (Simpson, 1855); Sedgwick Museum Cambridge, no. J18221; from Wright (1881, pl. 22A, fig. 9); × 1·82. F, *Eparietites denotatus* (Simpson, 1855); holotype, Sedgwick Museum Cambridge, no. J3273; from Wright (1881, pl. 22B, fig. 1); × 1·68.

cannot be older than the Stellare Subzone. On grounds of lithology and fauna, the nodule is likely to have come from Bed 85 of Lang and Spath (1926). Similar accompanying fossils are also found in Bed 87, but this also includes belemnites and brachiopods which are not apparent in the present nodule. Both beds 85 and 87 fall in the Stellare Subzone (Palmer 1972; Page 1992, p. 145). The horizon of the fossil cannot be younger than the Stellare Subzone, because the higher part of that subzone and the succeeding Denotatus Subzone are missing from the Dorset coast section (Page 1992, p. 152, fig. 4) and the accompanying ammonites do not range into the Densinodulum Subzone which forms the next part of the local sequence.

Preparation and method of study. Two areas of the ventral part of the last whorl are missing, having been lost before fossilization. This allowed preparation to expose the ventral part of the penultimate whorl (Text-fig 1). The side view was reconstructed as follows. A cardboard template was made to fit the surviving parts of the venter, and the outline transferred to paper. Assuming that the curve of the venter approximates to a logarithmic spiral, the spiral angle (α) and the centre of the spiral were found by trial and error. For the last half of the penultimate whorl, $\alpha = 84{\cdot}5°$ was found to fit; for the first half of the last whorl, $\alpha = 83°$ and for the second half of the last whorl, $\alpha = 85{\cdot}5°$. These figures are not highly accurate but are considered adequate for the purpose. The missing parts of the ventral curve, back to the part of the penultimate whorl exposed by preparation, were reconstructed using the polar formula:

$$r = ae^{\theta \cot \alpha},$$

where r = radius at an angle of rotation (θ) from initial radius a, and e is the base of natural logarithms (Obata 1960). The ventral curve was extrapolated to a diameter of 128 mm, corresponding to the end of the umbilical suture as preserved. The resulting reconstruction is shown in Text-figure 2. The whorl section at B was drawn by fitting a template, and the inner part completed from the venter of the penultimate whorl exposed by preparation.

Diagnosis. As for genus.

Description. The last preserved part of the venter is at a diameter of 114 mm. The diameter corresponding to the last preserved part of the phragmocone is about 128 mm (see above). Suture lines are visible almost to the end of the last whorl, but it is likely that the beginning of the body-chamber is present. The excentric umbilical suture is likely to be an adult feature. Such 'uncoiling' is typical of the body-chamber of many involute ammonites but is here unusual in starting at least half a whorl before the end of the phragmocone.

The earliest part of the shell seen, revealed by preparation at an estimated diameter of 50 mm, shows the same characters as the last septate whorl. The whorl section is trigonal, the height slightly greater than the thickness, becoming slightly more compressed at the end of the last preserved whorl. The holotype is too incomplete for the standard measurements to be made.

Parts of the external suture line are visible in three places: on the right hand side at a diameter of 114 mm; about half a whorl behind this, where lateral lobes are visible; and on the left hand side, at a diameter of 93 mm, where parts of several external saddles are visible. The suture line is illustrated in Text-figure 3A–C.

The external suture apparently comprises three saddles but the parts seen are inadequate to reconstruct the whole suture beyond doubt (Text-fig. 3A). The first and second lateral saddles are distinctive in being very short with a truncated appearance (Text-fig. 3B). The external saddle appears to be long and narrow (Text-fig. 3C).

Suture lines of *Eparietites* (Text-fig. 3E–F) are similar to that of the new ammonite chiefly as regards the external saddle. Closer comparison may be made with a specimen said to be from beds with *Slatterites* at Drake's Broughton, Worcestershire, identified by Spath as *Oxynoticeras* aff. *simpsoni* (Simpson), the suture of which was figured by him (Spath 1925*a*, p. 110, fig. c) and is reproduced here (Text-fig. 3D). This has short lateral saddles rather like those of *Bagnolites*. It remains possible that the unusual suture line is abnormal but its consistent appearance wherever seen on the specimen argues against this.

Remarks. The inadequate evidence for ammonite phylogenies in the Upper Sinemurian has been referred to above, and not much more can be added. *Bagnolites* has a venter similar to that of *Eparietites* but otherwise has little resemblance to that genus. It seems improbable that it was ancestral to *Eparietites*, and more likely that it was a parallel development from an unknown form which had already evolved the *Eparietites* form of venter in early Obtusum Zone times. The resemblance of the suture line of *Bagnolites* to that of *Oxynoticeras simpsoni*, the earliest species of *Oxynoticeras*, could be held to show that *Bagnolites* was near the (otherwise unknown) immediate ancestors of *Oxynoticeras*.

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